

'The Flight of Thunderbolts'

This was the title of a book written just a few years ago by Sir Basil Schonland.* It tells of the thunderbolts, a phenomenon which is as much a part of our cosmic world today as it was when our forebears saw it as a weapon of their Gods.

Ignorance of the scientific foundation of lightning did for a period, it seems, enhance one's chances of death. Schonland describes how in early times in Europe, man, aware that lightning was an act of God, sought to protect himself by prayer. It was usual to supplement prayer by the violent ringing of church bells and, accordingly, bell ringing became a practice during thunderstorms. Lightning has such an affinity for church steeples that this custom resulted in tragedy. Schonland quotes a book published in Munich in 1784 giving the data that in 33 years, 103 bell-ringers had been killed in this way. This was, of course, before the implementation of the remedy which Benjamin Franklin had found for protecting buildings from the effects of lightning. He discovered that lightning was merely a flash of electricity which could be diverted harmlessly to ground by the use of a lightning conductor.

Lack of true knowledge of the physical world can be a source of unnecessary hardship to mankind. It is interesting to quote from Schonland thus:

Between 1926 and 1930 three accusations against witch-doctors concerning crimes . . . which involved the control of lightning as a guided missile, were brought before the native courts of the Kgatta tribe in the Bechuanaland Protectorate. One was a charge of actual murder by lightning; the accused pleaded guilty and admitted that he had successfully directed a lightning flash to kill another man. The other two cases were charges of malicious damage to property, both

* *The Flight of Thunderbolts*, Clarendon Press, 1964, p. 4.

of the accused having set huts alight by directed lightning. All were found guilty and punished; the confessed lightning murderer (to make the punishment fit the crime) was, by order of the presiding chief, severely branded in the mouth with a piece of burning wood.

We can discount this as ignorance or lack of civilization, but surely ignorance is relative and we too will be judged ignorant by future generations. Our modern knowledge of these destructive phenomena of Nature is not as great as many may believe. The subject of thunderballs, an apparent by-product of thunderbolts, has been under scrutiny in the journal *Nature** in 1970:

In some parts of the world, earthquakes are often accompanied by ball lightning, stroke lightning and sheet lightning. The only causal connection that seems possible is that seismic strains of the earthquakes cause an electric field in the air, which in turn produces ball lightning and stroke and sheet lightning.

It would seem that we do not yet understand the processes by which the electric origins of lightning are explained. Lightning is electricity, but how is lightning generated? There are conventional explanations, but it seems that they are inadequate to explain what happens in earthquake conditions. More will be said about this later, but here we are confronted with the problem of ball lightning, and this may not simply be dismissed as electricity.

We have several reports of ball lightning floating for several seconds down the aisles of metallic passenger aircraft, as well as into homes.

This is quoted from a paper by Altschuler and his colleagues, writing from the High Altitude Observatory, National Center for Atmospheric Research, Boulder in USA.† The authors also mentioned observations of lightning balls which glow red, one which measured about 60 cm in diameter, moved into the ground and dug a trench, and another which moved into the water in a rain barrel and dispersed itself heating the water. Analysis of data showed that the balls have a very large energy density which defies explanation. Their energy is released non-explosively. They can move into objects carrying their energy into the core of the substance. They appear able to float without inducing convection effects, as if buoyantly supported in space. They are

* *Nature*, Vol. 228, p. 759, 1970. † *Nature*, Vol. 228, p. 545, 1970.

stable and display certain electrical effects as well as generating acoustic, visible, infrared and ultraviolet radiation. It is evident that if they were to move into the human body there could be fatal consequences, but what are they?

Seven years earlier, in 1963, D. J. Ritchie of the Bendix Corporation in the United States wrote a paper* concluding:

No matter what may prove ultimately to be the proper explanation of the phenomenon in nature, the manifold directions of research into ball lightning are opening new possibilities for the service of mankind.

His paper was prefaced with the statement:

As with unidentified flying objects, the origins as well as the existence of ball lightning have, in the past, been extremely controversial, with some authorities insisting that such a phenomenon did not exist. However, not only has recent work corroborated the existence of ball lightning, but many data, both analytical and experimental, have been produced.

Ritchie was experimenting on the assumption that the thunderball is an ionized sphere of gas energized by the induction of short-wave electromagnetic oscillations produced in a thunderstorm.

In his 1964 book Sir Basil Schonland commented:

A significant number of earlier reports on ball lightning has likened their behaviour to that of soap bubbles.

Referring to theories advanced to explain them he says:

Some of these suppose that part of the highly ionized channel of a flash is detached (for reasons not understood). But for this detached portion to continue to glow for a few seconds is inexplicable unless some other outside agency supplies it with energy and . . . there is no evidence at all for any such source, which would have to be prodigious.

After dismissing all prospective explanations, the 1970 Altschuler paper resorted to the suggestion that the energy source might be nuclear in origin, but concluded also that there were numerous and difficult theoretical objections to this nuclear hypothesis.

Dare one suggest that they are nothing more than simply a

* *Journal of the Institution of Electrical Engineers*, 1963, p. 202.

phenomenon of the unseen aether medium? A rotating sphere of aether would have all the properties evidenced by the thunderball. The writer, having a firm belief in the aether, showed that the energy content of the thunderball can also be explained easily and in perfect relation with other theory he has presented elsewhere.* However, the journal *Nature* declined to publish such an account for the reason that 'it is not of sufficiently wide significance'.

It is curious to see what man does regard as significant. The writer well remembers his flight from London to New York on June 15, 1970 (BOAC flight No. 591), when the pilot announced the sighting of 'an unidentified flying object' crossing above our flightpath ahead—a spinning object. The passengers were invited to view it. I heard no more of it after the flight. Presumably this is not an unusual occurrence and therefore not particularly significant, but I wonder what might have happened had we flown into it. An event of some personal significance may well have occurred. Would perhaps we have had a rather large thunderball floating down the aisle of the aircraft?

If the thunderball is to become a nuclear phenomenon instead of simply a turbulence, eddy or whirlpool in the aether, this is in line with history. We do not know what it is for certain. If we like to believe it to be nuclear then that is our open choice. It is probably the same with our understanding of the heat source which sustains our lives, the sun. We have not known of nuclear energy for that many years, but we are now assured that the sun is one massive nuclear furnace. We do not know quite why it does not blow up in one large bang, but, for want of a better explanation, it keeps us content to imagine that the sun's energy is of nuclear origin. At the risk of appearing cynical, dare it be suggested that perhaps it is a very large thunderball, or rather a very large ball of the kind we associate with the thunder and lightning phenomena.

One might wonder if the men of ancient times ever perceived these thunderballs as miniature suns, after noticing their bouyancy in space and witnessing them dipping into water and dispersing energy.

* *Physics without Einstein*, Sabberton Publications, Southampton, 1969.

In *The Story of the Heavens*, Sir Robert Stawell Ball* relates:

The old mythology asserted that after the sun had dipped in the western ocean at sunset (the Iberians, and other ancient nations, actually imagined that they could hear the hissing of the waters when the glowing globe was plunged therein), it was seized by Vulcan† and placed in a golden goblet. This strange craft with its astonishing cargo navigated the ocean by a northerly course so as to reach the east again in time for sunrise the following morning. Among the more sober physicists of old, as we are told by Aristotle, it was believed that in some manner the sun was conveyed by night across northern regions, and that the darkness was due to lofty mountains which screened off the sunbeams during the voyage.

The object of these early ideas was to explain, not the nature, but the apparent motion of the sun. Nevertheless, it was conceived as a ball of fire, the origins of which were beyond speculation. It is of interest to wonder how the physicist contrived to explain the source of the sun's heat before the advent of nuclear theory. One viewpoint attributed to Sir William Herschel in a book published in 1852‡ is expressed in the words:

In order to account for the various appearances of the spots (on the sun), he supposed the sun to be surrounded by a transparent atmosphere, in which are suspended two distinct strata of clouds at different elevations. The upper stratum is composed of self-luminous clouds which constitute the source of solar light. The lower stratum is composed of opaque clouds, which shine only by the reflexion of the luminous regions above them.

The fact is that the centres of the sunspots expose lower regions within the sun and, by the physics we accept, these inner central regions are darker and therefore at lower temperature than the outer regions. Herschel's argument that the energy source is a shell enveloping the sun can have some truth in it. Furthermore, there are still some voices left to argue that the sun's energy is not direct nuclear radiation. For many years a scientist named Bruce has been urging a theory that the solar radiation comes from continuous lightning discharges at the

* Published by Cassell, London, 1897.

† The Roman god of fire, son of Zeus.

‡ *History of Physical Astronomy*, by Robert Grant, Bohn, London, 1852.

surface of the sun. Sir Basil Schonland mentioned this in the last words of his book. He writes:

Many hot stars, including our own sun, emit radio waves of high frequency which penetrate our ionosphere; their sources are hot plasmas in stellar magnetic fields and hardly qualifying for description as thunderstorms. But whether any of the dying stars have relatively cold atmospheres in which thunderstorms could be created is an interesting speculation. Bruce has developed ingenious theories to explain in this way the periodic bursts of light from the long-period variable stars which make them on the average 100 times and sometimes 10,000 times brighter at maximum than at minimum. It is too early to form a judgment on his many remarkable proposals which extend to lightning discharges in nebulae with channels 1,000,000 light years long.

To the writer, the idea of a shell of the solar atmosphere being the source of radiation by electric discharges has appeal. The reason is that, as such, it would not be at a uniform temperature and would appear hotter from observations assuming uniform temperature. Thus, the inner parts of sunspots could be at the same temperature, or nearly at the same temperature, and yet appear darker. The problem envisaged by Schonland of the sun being too hot to sustain the mechanism by which thunderstorms are created can be swept aside, as we shall see in Chapter 5. We have reason to see that the cosmos provides a powerful mechanism by which electric fields and consequent electric discharges are produced. If the modern scientist cannot yet be sure how breakdown level electrical charges can be produced in our own atmosphere, then he should think seriously about Bruce's claims that this fundamental mechanism is at work at the surface of our sun.

If progress can be made along a new track for explaining the origins of solar radiation, we may yet explain the origin of the solar system and the primordial energy source of our universe.

Taking note that rotating glowing spheres can be produced from lightning discharges, the thunderballs seen on the earth, is it not possible that Bruce's theories about cosmic lightning discharges might spell for us the origins of our own sun? The sun could be a rotating sphere of aether evidenced by its electrical action in ionizing co-extensive gaseous matter. The

sceptical reader might say that it could equally be explained by many other notional concepts. However, that is negative thinking and what is proposed here is constructive.

Let us risk a little speculation. If a spherical volume of the unseen aether medium rotates, it may result in an electric displacement effect radial from its axis of rotation. It is well known from Maxwell's work that a vacuum exhibits electric displacement properties so we are not making an unreasonable proposition. Rotation of a sphere of aether would then develop a magnetic field. It is easy then to say that if such a sphere housed an ionized plasma rotating with it, then both the radial electric field and the magnetic field would be cancelled. However, we know that the sun has a magnetic field and we also know that 'lightning balls have been known highly to magnetize metallic objects such as gun-barrels'.* Therefore, the cancellation may only be partial and we can examine with justified curiosity the properties of the rotating aether medium.

Furthermore, the association of earthquakes and lightning implies a link between gravitation and lightning. The form of this link may be the aether medium. The prospect that cosmic electricity can produce tremendous electric discharges which may induce aether rotation and the formation of bodies like the sun is an exciting thought. The problem is how to proceed with these ideas. In the next chapter we will follow the early background of gravitational theory in the hope that this may help us to forge the links we seek.

* Quoted from the Ritchie paper referenced on page 10. Also note that since the Altschuler paper referenced on page 9 was published, A. A. Mills writing in *Nature Physical Science*, October 18, 1971, p. 131, has questioned the nuclear hypothesis. Mills tested a piece of church masonry known to be struck by ball lightning, looking for radiation dosage. He concluded tentatively that 'the incident at St. George's provides no evidence to support a ball lightning mechanism involving a strong source of radiation'.